

REMARKS

Claims 21-59 are pending in this application, of which claims 21-29 are presently under consideration.

Claims 21-27 stand rejected under 35 U.S.C. 103(a) as unpatentable over Applicants' Admitted Prior Art (AAPA; Applicants' Figure 2) in view of U.S. Patent No. 6,734,559 to Yang. Reconsideration is respectfully requested.

Claim 21 is directed to "an electrode structure, comprising: a first conductive layer; a dielectric layer over said first conductive layer, said dielectric having an opening exposing a portion of said first conductive layer; an adhesion layer in said opening in said dielectric layer and over said exposed portion of said first conductive layer; a second conductive layer formed at least partially over said adhesion layer, wherein said second conductive layer and said adhesion layer are recessed within said opening in said dielectric layer; and a third conductive layer formed over and at least partially in contact with said second conductive layer and said adhesion layer within said opening." The remaining claims under consideration depend directly or indirectly from claim 21.

The Office Action cites Applicants' Figure 2 as teaching each of the above claim features, with the exception of the claimed "third conductive layer ... in contact with said second conductive layer and said adhesion layer". Office Action, November 29, 2006, page 3. In addressing this deficiency, the Office Action states that the interconnect barrier layer 206 of Yang's Figure 4 anticipates the claimed third conductive layer; and that one skilled in the art would be motivated to substitute the interconnect barrier layer 206 of Yang's Figure 4 for the top electrode 210 of Applicants' Figure 2 to thereby produce the claimed invention. Office Action, November 29, 2006, page 3.

Applicants first note that Figure 4 of Yang is not the structure taught by Yang. It is an intermediate and the final contact structure is only shown in Figure 5, which **does not have** interconnect barrier 208 (formed from interconnect barrier layer 206) in contact with the first channel 201 and barrier layer 221. Any proper teaching of Yang is with respect to Figure 5. Since Figure 5 does **not** have the interconnect barrier 208 in contact with first channel 201 and the adhesion layer barrier layer 221, even if it were properly combinable with Applicants' Figure 2 (which it is not) the claimed invention would not be attained.

The Office Action does not specify sufficient (if any) motivation to replace the top electrode 210 of Applicants' Figure 2 with the interconnect barrier layer 206 of Yang's Figure 4. Rather, the Office Action merely states:

However, Yang teaches a third conductive layer [interconnect barrier layer] 206 partially in contact with the second conductive layer [first channel] 201 and the adhesion layer [barrier layer] 221 (col. 4, lines 20-34 and Fig. 4) It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form the third conductive layer in contact with the second conductive layer and the adhesion layer in order to obtain the contact plug structure.

Office Action, November 29, 2006, page 3. Applicants respectfully submit that this asserted motivation "to obtain the contact plug structure" does not suggest the proposed modification, i.e., does not suggest the substitution of Yang's interconnect barrier layer 206 for the top electrode 210 of Applicants' Figure 2, for several reasons.

Even assuming *arguendo* that the asserted motivation "to obtain the contact plug structure" is supported by AAPA or Yang (no citation is provided by the Office Action for such motivation), at best that motivation would suggest substituting the entire contact plug of Yang (components 201, 208, 221, and 222) for the entire contact plug of Applicants' Figure 2 (components 110, 112, 200, and 210). That modification does not produce the claimed invention.

Furthermore, the intermediate interconnect barrier layer 206 of Figure 4 is not part of the "contact plug structure" of Yang. Rather, the interconnect barrier layer 206 of Figure 4 is blanketed over the entire surface of semiconductor wafer 200 as an intermediate step in forming the interconnect barrier 208 of Figure 5 (which, on the other hand, is part of the contact plug structure). Therefore, even assuming *arguendo* one skilled in the art would be motivated "to obtain the contact plug structure" of Yang, the modification to obtain the contact plug structure would not incorporate the intermediate interconnect barrier layer 206.

Though that modification would incorporate the interconnect barrier 208, unlike the interconnect barrier layer 206, the interconnect barrier 208 does not contact the first channel 201 and barrier layer 221 of Yang. Thus, as suggested by the above-quoted portion of the Office Action, the interconnect barrier 208 cannot anticipate the claimed third conductive layer "in contact with said second conductive layer and said adhesion layer".

In addition, Applicants note that the proposed substitution of the interconnect barrier layer 206 of Yang's Figure 4 for the top electrode 210 of Applicants' Figure 2 would render the resistance variable memory device of Applicants' Figure 2 inoperable by blanketing the entire top surface of the device with the interconnect barrier layer 206. The memory element 200 of Figure 2 is only one of many such elements arranged within an array of the resistance variable memory device. Applicants' specification, U.S. Pub. No. 2005/0214155, para. 29. Depositing the interconnect barrier layer 206 over that array would render the resistance variable memory device of Applicants' Figure 2 inoperable by preventing the memory elements 200 from being individually accessed. As the proposed substitution would render the resistance variable memory device of Figure 2 unsatisfactory for its intended purpose, there can be no suggestion or motivation to make that proposed modification. See *In re Gordon*, 221 USPQ 1125 (Fed. Cir. 1984).

Applicants also note that the Office Action makes the proposed modification "to obtain the contact plug structure" of Yang, but does not provide a specific reason as to why one skilled in the art would desire to use that contact plug structure in the resistance variable memory device of Applicants' Figure 2. The mere fact that a prior art device could be modified to produce a claimed invention (not admitted) cannot alone support an obviousness rejection, because there must be some suggestion of a **desirability** to make the modification. In *re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)." MPEP 2143.01. No such desirability has been shown by the Office Action.

Accordingly, for the above-stated reasons, Applicants respectfully requests that the above rejection be withdrawn. If the rejection is not withdrawn, then Applicants requests a new rejection citing motivation either within AAPA or Yang (or within the general knowledge of the art) suggesting that one skilled in the art would desire to substitute the interconnect barrier layer 206 of Yang's Figure 4 for the top electrode 210 of Applicants' Figure 2.

Applicants further note that the Office Action is deficient in the treatment of claim 23, which recites: "The electrode of claim 21, wherein said third conductive layer is patterned." In addressing this feature, the Office Action states that AAPA at paras. 25-29 teaches the top electrode 210 of Applicants' Figure 2 as being patterned. Office Action, November 29, 2006, page 3. However, as shown in Applicants' Figure 2, such patterning would prevent the substituted interconnect barrier layer 206 (substituted for the top electrode 210) from contacting

the barrier layer 221 of Applicants' Figure 2, and thereby prevent the substituted interconnect barrier layer 206 from anticipating the claimed third electrode.


Accordingly, Applicants request that the rejection of claim 23 be withdrawn. If the rejection is not withdrawn, Applicants request a new rejection explaining why the patterning taught with respect to Applicants' top electrode 210 would not undermine the proposed modification relied upon in the rejection of base claim 21.

Claims 28 and 29 stand rejected under 35 U.S.C. 103(a) as unpatentable over AAPA in view of U.S. Patent No. 5,914,851 to Saenger. As Saenger does not cure the above deficiencies of AAPA and Yang, Applicants respectfully request that this rejection be withdrawn.

In view of the above arguments, favorable action on this application is solicited.

Respectfully submitted,

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